

CLAIMS

What is claimed is:

1. A method for reducing the emission of gaseous products into the atmosphere comprising the steps of:
 - a. producing a reaction product comprising a hot mixed gas stream by feeding a reaction feed mixture through an inlet of a reaction vessel, and passing the reaction product through an outlet of the reaction vessel;
 - b. producing a cooled mixed gas stream by directing the hot mixed gas stream through a heat exchanger system;
 - c. separating the cooled mixed gas stream into a cooled crude product stream and a cooled waste stream;
 - d. producing a preheated waste stream by directing the cooled waste stream through a heat exchanger system; and
 - e. incinerating the preheated waste stream by directing it into an incinerator.
2. The method of claim 1, wherein the heat exchanger system of step b is the same as the heat exchanger system of step d.
3. The process of claim 1, wherein the cooled crude product comprises acrylic acid.
4. The method of claim 1, wherein separation of the cooled mixed gas stream into the cooled crude product stream and the cooled waste stream comprises passing the cooled mixed gas stream into a separator column.
5. The method of claim 1, wherein the preheated waste stream is incinerated in an incinerator.

6. The method of claim 1, wherein the heat exchanger system of either step b, or step d, or both steps b and d, comprises a shell and tube exchanger configured to ensure that each constituent of the hot mixed gas stream remains above the respective constituent's melting point.
7. The method of claim 6, wherein the shell and tube exchanger comprises a shell portion and a tube portion, and a series of disk-shaped and donut-shaped baffles disposed within the shell and tube exchanger's shell portion, said series of disk-shaped and donut-shaped baffles being configured such that the hot mixed gas alternates across the tubes of said shell and tube exchanger.
8. The method of claim 1, wherein the gaseous emissions comprise at least one of the following: nitrogen dioxide, nitric oxide, and carbon monoxide.
9. The method of claim 1, wherein the preheated waste stream is incinerated through the use of a preheated supplemental fuel.
10. The method of claim 9, wherein the preheated waste stream is incinerated through the use of a preheated oxygen-containing stream.